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Moths," "Catalogue of the Sphingidæ of North America," "Catalogue of the Zygaenidæ of North America," "Conclusions drawn from a study of the Genera Hypena and Herminia." The second number, which was received by us on Aug. 2d, contains two more plates of moths illustrating two papers by Mr. Grote entitled "Contributions to a Knowledge of North American Moths" and "A Study of North American Noctuidæ." It also contains a paper of thirty-two pages of "Descriptions of New Species of Fungi," by Chas. H. Peck. ^s

We congratulate the society on the very creditable appearance of these two parts of its first volume, and think that it will find this prompt publication of papers read before its meetings of far more value to the authors in the matter of priority than the documents it has sent out regarding them.

BOTANY.

THE FERTILIZATION OF GRASSES.—Prof. Hildebrand, a German botanist who has paid great attention to the subject of the fertilization of flowering plants, has recently made an important series of observations on the fertilization of grasses, and especially of cereals. The agent of fertilization in all grasses, except those few in which the flowers never open, is the wind, insects apparently playing no part in it. With this object the pollen grains are very fine and smooth, so that they are at once dispersed by a breath of air; the filaments are usually not stiff, but versatile, and the stigma is either feathery, or presents a large surface with numerous indentations in which the pollen is easily lodged. These contrivances render cross-fertilization inevitable; and, while self-fertilization is in most cases not absolutely prevented, it is generally rendered very difficult. Many species, however, which are ordinarily cross-fertilized never open their flowers when the weather is cold and rainy, and are, in such circumstances, necessarily self-fertilized. In grasses with unisexual flowers, cross-fertilization must take place as a matter of course. In those with hermaphrodite flowers a few are protogynous, and hence also necessarily cross-fertilized. In the larger number of grasses, however, the male and female organs are developed at the same time, and special contrivances occur for ensuring cross-fertilization. In the rye the position of the organs is such that a part of the

pollen from one flower must almost necessarily fall on the stigma of another flower. In the wheat each separate flower remains open only for an extremely short time, the glumes separate from one another suddenly, the anthers immediately protruding, and a large quantity of the pollen is dispersed into the air, the whole process not occupying more than half a minute. In most of these cases the stigma remains receptive only for a very short period and then dies, while in others the stigma remains in a receptive condition till long after the anthers have dropped off, and then must necessarily be open to the access of foreign pollen. In comparatively few cases the natural contrivances appear to favor self- rather than cross-fertilization. Thus in the oat and barley the majority of the flowers never open, and are, therefore, necessarily self-fertilized; there appear, however, in almost all cases to be a small number of flowers, often arranged in one or two separate rows, which do open, and therefore may introduce occasional cross-fertilization. It is probable that the same species behaves differently in relation to its arrangements for fertilization under different circumstances of climate, while species very nearly related exhibit phenomena which offer a marked contrast.—A. W. B.

STRUCTURE AND PROPAGATION OF LICHENS. — The theory of Schwendener that Lichens are not separate organisms but are composed of Fungi, parasitic on Algæ (the so-called gonidia), has not, up to the present time, found much favor with cryptogamic botanists, Sachs being almost the only physiologist of repute who has as yet adopted it. The theory has, however, recently met with some countenance from the researches of Woronon on the lichens *Parmelia pulverulenta* and *parietina*. He confirms the previous statements of Famintzin and Baranetzky that the gonidia of these lichens produce zoospores which he describes as bi-ciliated; and he gives an exact account of their mode of escape from the gonidia. These zoospores, after the cessation of their vibratile motion, caused by the cilia, become covered by a membrane after the ordinary mode of the zoospores of Algæ, and form themselves into gonidiform bodies, increasing by division, but producing neither filaments nor hyphæ, but only giving birth to new gonidia, in other words, to young individuals of a unicellular alga of the genus *Cystococcus*. The observation of the actual germination of the zoospores is a link in the chain, hitherto wanting.—A. W. B.

CLEISTOGENOUS FLOWERS IN *VIOLA STRIATA*.—When we take Gray's Manual, and find no mention of a striking fact, we conclude that what is not known to so excellent a botanist must be new. Yet to me the production of cleistogenous flowers by *Viola striata* is so old a fact that only its omission from the manual leads me now to refer to it.*

The Manual confines the production of these flowers to the acaulescent species which it says "produce apetalous flowers from underground stolons during summer." *V. striata* belongs to the leafy-stemmed section, and produces an abundance of these flowers from midsummer till frost. In early spring the petaloid flowers come out from the axils of the four lowest nodes; six or eight nodes are then formed, in which the axillary bud is developed into a branchlet instead of a flower, and all the succeeding nodes bear leaves with apetalous flowers from the axils, which produce seed very profusely.

Physiologically speaking there is nothing remarkable in this. As suggested in my remarks on *Fragaria "Gilmani"* some years ago, a stolon or runner is but an upright caulis which has lost the power of erection, and characters common to one easily appear in the other with little or no modification.—THOMAS MEEHAN.

SPHAGNUM AND HYPNUM PEAT.—The opinion seems to have been somewhat prevalent that peat does not accumulate abundantly in limestone regions, but this is not true of large portions of some of the northern interior states. For example, all the peat of Iowa is in an eminently limestone region and the water taken out of any of the marshes shows a strong reaction for lime by proper chemical tests.

From my own observations I believe that Sphagnum peat does not accumulate in limestone regions, but that the peat mosses of such regions all belong to the genus Hypnum. I have found no other moss entering into the composition of Iowa peat.

Another fact observed in this connection has doubtless much significance, namely; the Ericaceæ are almost entirely wanting in Iowa, and no plants of that order have yet been observed by myself in or about these Hypnum marshes. The principal plant assisting the Hypnum in the production of peat is a kind of grass.

Should one go north from Iowa or Illinois into the metamorphic

* It is well known in *Viola canina* of Europe, and here in *V. Canadensis*.—EDS.

regions of Minnesota and Wisconsin, I think he would see the Hypnum gradually give place to Sphagnum in the marshes, and the marsh Ericaceæ appear with the last named moss.

In short, lime seems to be an uncongenial element in the habitat of both Sphagnum and most if not all ericaceous plants, but is not uncongenial to Hypnum and grass. Therefore the abundant presence of lime will not necessarily prevent the accumulation of peat.—C. A. WHITE.

ZOOLOGY.

CENTRONYX "OCHROCEPHALUS" *Aiken*.—This nominal species, described by Mr. Aiken in a recent number of the NATURALIST,* is neither entitled to specific rank, nor even to a name as a well marked variety or race. This deduction I have adopted after a careful examination of the two specimens of it collected—one, the type, in the museum of the Smithsonian Institution, the other in the collection of Mr. R. Ridgway—and their comparison with Audubon's type of *C. Bairdii*. The color differs in the two types very appreciably, indeed as much and even more, than in many well established and closely allied species: but while the specific distinctness of these is sustained by large series of specimens in which there is scarcely any gradation, or a too close approximation in coloration, the validity of the *C. "ochrocephalus"* is entirely overthrown by the second specimen obtained, which is exactly intermediate in color, as it is in season of collection, between the first and the single specimen of *C. Bairdii*. The emarginate tail of Aiken's sparrow, as compared with the doubly rounded one of Baird's, has little weight as a character. The *C. Bairdii* undoubtedly possessed this feature, as is apparent from the appearance of the plumage, which everywhere exhibits a worn and bleached surface: and in some places the vanes at the tips of the feathers are worn quite off from the shafts; this is especially noticeable in the rectrices. The most cogent reason for considering it distinct from *C. Bairdii* lies in the differences in their relative size and proportions—*C. "ochrocephalus"* being considerably the larger; but, even in this, it does not exceed the proportion of variation which should be recognized as occurrent in a species.

*Vol. vii, p. 237, 1873.